Alternative Organic Sanitary Pads From Plant Fibers Enhanced with Gooseberry Extract Coating

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Sanitary pads are critical for effective menstruation management, especially in developing countries where access to high-quality menstrual hygiene products is commonly limited. In these areas, the use of inferior sanitary products frequently leads to health problems, such as vaginal infections. Additionally, most available options are made from synthetic polymers that are non-biodegradable and detrimental to the environment. To tackle these challenges, we developed organic sanitary pads using fermented plant fibers derived from pineapple leaves (Ananas comosus L.), banana sheaths (Musa sapientum L.), hemp stems (Cannabis sativa L.), and paper mulberry (Broussonetia papyrifera L.). These fibers are treated with Actinomycetes and Aspergillus sp. to facilitate the degradation of recalcitrant lignocellulose through the action of lignocellulolytic enzymes. Post-treatment analysis revealed that banana and paper mulberry fibers demonstrated favorable physical and mechanical properties for fluid absorption. To produce organic sanitary pads, we incorporated a crude gooseberry extract as a top coating on a 0.20 mm thick woven layer of banana fiber, which effectively inhibited Staphylococcus aureus and Candida albicans, common pathogens responsible for vaginal infections. The middle layer of the pad features a 0.60 mm thick absorbent core made from paper mulberry sheets, and the base layer is waterproof bioplastic. Furthermore, our organic sanitary pads meet the ISO standards for sanitary napkins, achieving an optimal absorbent capacity, absorption time, and pH level. This development provides a sustainable alternative to conventional synthetic products, potentially expanding to broader applications and offering an environmentally friendly solution with widespread usability.

Awards Won:

U.S. Agency for International Development: Second Award Global Health and Nutrition